

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

Patent Claims

1. Pneumatic vehicle tires comprising a multi-ply carcass, which extends between two bead rings having associated bead apexes, a belt arrangement provided between the carcass plies and a tread strip and also rubber reinforcing plies arranged in the side wall regions, which take on a supporting function with a deflated tire, characterized in that a first rubber reinforcing ply (4) is arranged radially inside a first carcass ply (1), a second rubber reinforcing ply (5) is arranged between the first carcass ply (1) and a second carcass ply (2), and a third rubber reinforcing ply (6) is arranged between the second carcass ply (2) and a third carcass ply (3); in that the three rubber reinforcing plies (4, 5, 6) extend, starting from the bead apex region with mutually displaced ends, up to and beneath the edge region of the belt ply (10); in that the three rubber plies (4, 5, 6) have a different height in the radial direction and different thicknesses over the height of the side wall; and in that, with a bead apex (9) provided, the radially inner end regions of all three rubber plies (4, 5, 6) are disposed on the axially inner side of the bead apex (9).
2. Pneumatic vehicle tires in accordance with claim 1, characterized in that the ends (11) of the radially innermost, first, carcass ply (1) are led around the respective bead ring (8) and are overlappingly connected to the respective end (12) of the outer, third, carcass ply (3); and in that the middle carcass ply (2) terminates axially inside the bead apex (9) adjacent to the respective bead ring (8).

3. Pneumatic vehicle tires in accordance with claim 1 or claim 2, characterized in that all three rubber reinforcing plies (4, 5, 6) have a different thickness over their height and the middle rubber reinforcing ply (5) has a lesser thickness over an at least predominant part of the side wall height in comparison to the inner and outer rubber reinforcing plies (4, 6).
4. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that the tread side ends of the rubber reinforcing plies (4, 5, 6) terminate with an increasing distance from the central plane (13) of the tire, starting from the radially innermost ply (4).
5. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that the radially inner end of the radially outer rubber reinforcing ply (6) contacts the inner side of the bead apex (9).
6. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that radially inner end of the outer rubber reinforcing ply (6) is simultaneously formed as a bead apex.
7. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that all rubber reinforcing plies (4, 5, 6) are made so that they taper to a tip at their free ends in the cross-section.
8. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that the central carcass ply (2) is connected

in a region lying above the bead ring (8) to the radially inner carcass ply (1).

9. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that the carcass plies (1, 2, 3) consist of rayon.
10. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that the belt plies (10) consist of Kevlar or steel.
11. Pneumatic vehicle tires in accordance with claim 10, characterized in that the belt is stiffened by additional rubber between the belt plies.
12. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that all rubber reinforcing plies (4, 5, 6) and also the bead apex (9) consist of the same rubber mixture.
13. Pneumatic vehicle tires in accordance with one or more of the preceding claims, characterized in that the modulus of elasticity (E^*) of the rubber reinforcing plies (4, 5, 6) and also of the bead apex (9) are the same as or greater than 9 MPa when measured at 70°C and the $\tan\delta$ is the same as or smaller than 0.03, and indeed measured by means of "EPLEXOR": 10 Hz, 10 % prestress and 1 % DSA (double strain amplitude).
14. Pneumatic vehicle tires in accordance with claim 13, characterized in that the hardness IRHD of the rubber reinforcing plies (4, 5, 6) and also of the bead apex (9) are the same as or greater than 80

when measured at room temperature, with the measurement taking place in accordance with DIN 53915 and with small samples taken from the tire being measured.

15. Pneumatic vehicle tires in accordance with claim 12, characterized in that at least the rubber reinforcing plies (4, 5, 6) consist of a rubber mixture which is composed of a polymer mix of NR/IR and BR with at least 50 parts NR/IR, a carbon black content of 50 to 60 parts, 5 to 8 parts zinc oxide, 2 parts stearic acid, 1.5 parts aging protection agent, and also at least 1 part of vulcanization accelerator and sulfur, with the sulfur proportion preferably including 4 or 5 parts and with rapidly injectable FEF carbon black preferably being used as carbon black.
16. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that the rubber reinforcing plies (4, 5, 6) having a continuously changing thickness, have in total their greatest thickness in the region of the half side wall height, and also in the upper third of the side wall height.
17. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that, when measured at approximately two thirds of the side wall height and at the half side wall height, the thickness of the inner rubber reinforcing ply (4) amounts to 3.0 mm and 3.2 mm respectively, the thickness of the middle rubber reinforcing ply (5) amounts to 2.8 and 2.9 mm respectively, and the thickness of the outer rubber reinforcing ply (6) amounts to 2.9 and

3.3 mm respectively, with a tolerance of ± 0.5 mm applying to all measured values.

18. Pneumatic vehicle tires in accordance with one of the preceding claims and also claim 6, characterized in that, when measured in the region of maximum bead thickness (side wall height W), the thickness of the inner rubber reinforcing ply (4) amounts to approximately 2.5 mm, the thickness of the central rubber reinforcing ply (5) amounts to approximately 1.9 mm and the thickness of the outer rubber reinforcing ply (6) amounts to approximately 6.9 mm, with a tolerance of ± 0.5 mm applying to all measured values.
19. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that, when related to the axially outer edge of the breaker (10), the belt side end of the inner rubber reinforcing ply (4) is spaced by approximately 33 mm, the belt side end of the middle rubber reinforcing ply (5) is spaced by approximately 22 mm and the belt side end of the outer rubber reinforcing ply (6) is spaced by approximately 15 mm, with a tolerance of ± 2.5 mm applying to these measured values.
20. Pneumatic vehicle tires in accordance with one of the preceding claims, characterized in that the crown thickness (A2) measured at the center of the tire is 17.5 ± 0.8 mm and the tire thickness (C2) measured in the transition region of the shoulder and in the region of the ends of the rubber reinforcing plies (4, 5, 6) amounts to 18.5 ± 1.0 mm.